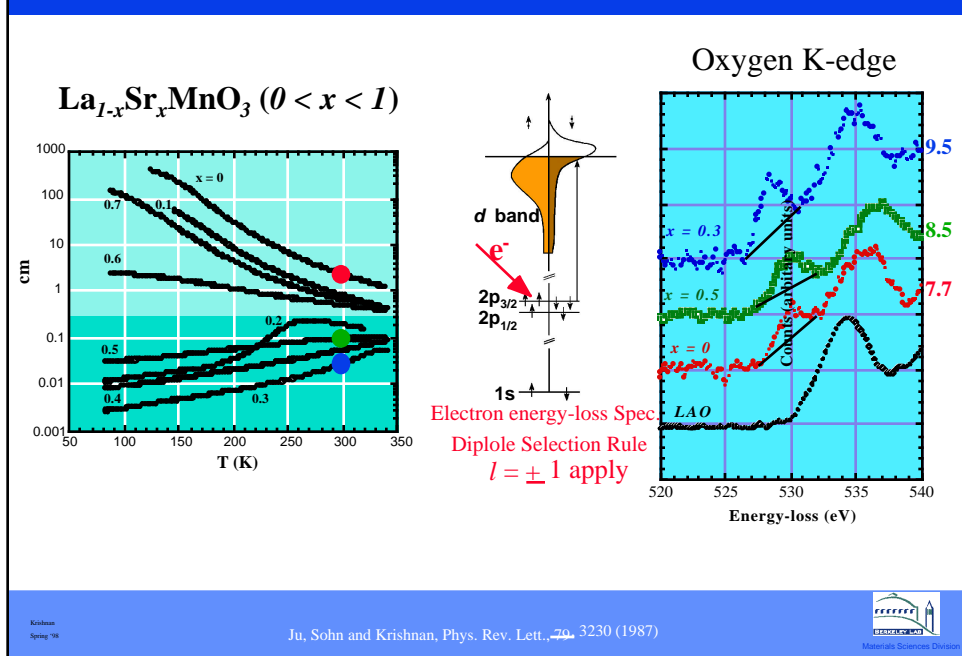


Evidence for O_{2p} hole driven conductivity in CMR oxides



This is a HIGHLIGHT of our most recent work to be published shortly in Physical Review Letters.

We prepared a range of well characterized samples by the sol-gel method developed in our laboratory. By careful doping we controlled the divalent doping (in one set of samples) and the oxygen content (in the second set).

We measured the temperature dependent magnetotransport behaviour of these complex oxides. The electronic structure of these well characterized samples was measured by electron energy-loss spectroscopy using the newly installed CM200/FEG microscopes.

No discernible change in the Mn L_{3,2} edges were observed either as a function of doping or oxygen content. However, the O-K edge (1s→2p transitions) intensity, sensitive to the 2p hole density on oxygen sites, varied systematically with the resistivity for both sets of samples.

By these measurements, we showed that these manganites are charge-transfer type insulators with significant conductivity due to holes on oxygen sites. This provides new insight into the transport mechanism in these oxides and suggests that the double exchange model, which implicitly assumes a Mott-Hubbard type insulator, has to be revised to include the role of oxygen hole mobility in the transport.